

# NCERT

## CHAPTER WISE

## TOPIC WISE

### LINE BY LINE QUESTIONS

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BY  
SCHOOL OF  
EDUCATORS

# 35.5 Cl

## 17 CHLORINE

### GENESIS OF CLASSIFICATION

#### DOBEREINER'S TRIAD (1852)

Middle element of each triad has an atomic weight about half way between the atomic weight of other two and also properties between the other two.  
Eg. (Li, Na, K) (Ca, Sr, Ba).

#### LÖTHER MEYER

Elements found a periodic pattern in increasing order of their atomic weight, every 8th elements had similar properties to 1st element.  
Eg. Li resembles with Na.

**MENDELEEV PERIODIC LAW**  
Properties of elements are a periodic function of their atomic weights.

Father of modern periodic table: **Dimitri Mendeleev**

Mendeleev periodic elements

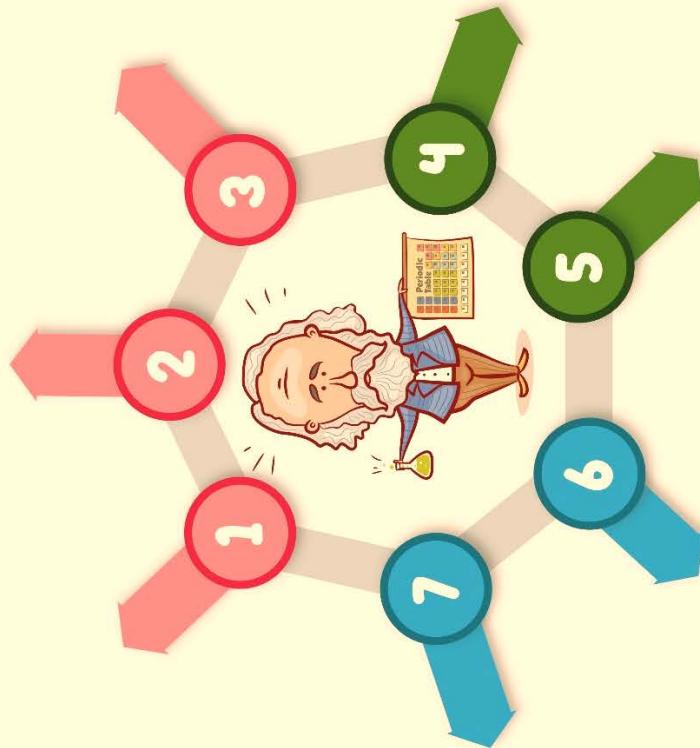
Eka-Aluminum as Gallium.

### NEED FOR CLASSIFICATION

To make it easier to understand the chemistry of all the elements and their compounds separately.

### TRENDS IN PHYSICAL PROPERTIES

Properties	Group	Period
(a) Atomic Radius Distance between the Atomic Nucleus and the outermost shell containing electrons.		Increases Decreases
(b) Electron Gain Enthalpy Energy released when an electron is added to the valence shell of an isolated gaseous atom.		Decreases Increases
(c) Ionisation Energy Amount of energy required to remove an electron from an isolated gaseous atom.		Decreases Increases
(d) Electronegativity Tendency of an element to attract shared electrons towards itself.		Decreases Increases
(e) Metallic Character		Increases Decreases
(f) Non-Metallic Character		Decreases Decreases



## CLASSIFICATION OF ELEMENTS AND PERIODICITY IN PROPERTIES

### TRENDS IN CHEMICAL PROPERTIES

- The valence of representative elements is generally equal to valence electron or (8-valence electrons).
- Anomalous behaviour of 2nd period elements is due to their small size, large charge/radius ratio, high electronegativity and only 4 valence orbitals.
- Diagonal relationship: Li and Be is more similar to Mg as Al respectively.
- The normal oxides formed by the elements on extreme left is most basic (E.g. Na<sub>2</sub>O) and formed by elements on extreme right is most acidic (E.g. Cl<sub>2</sub>O).
- Oxides of central elements are amphoteric (Eg. Al<sub>2</sub>O<sub>3</sub>) or neutral (Eg. N<sub>2</sub>O).
- Amphoteric oxides are basic in acidic medium and vice versa.

### MODERN PERIODIC TABLE

#### MODERN PERIODIC TABLE

- Modern Periodic Law: Physical and chemical properties of elements are periodic functions of their atomic number.
- Father of modern periodic table: **Dimitri Mendeleev**
- 7 Horizontal rows: Periods 18 Vertical columns: Groups

Periods	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	H																	
2	Li	Be																
3	Na	Mg	Al															
4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ge	Se	Br	Kr		
5	Rb	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ge	Se	Br	Kr	Xe	
6	Cs	Ba	La															
7	Fr	Ra																

### NOMENCLATURE OF ELEMENTS (ATOMIC NO. > 100)

Digit	Name	Abbreviation
0	Nil	N
1	Un	U
2	Bi	B
3	Tri	T
4	Quat	Q
5	Pent	P
6	Hex	H
7	Sept	S
8	Oct	O
9	Enn	E

### STUDY OF PERIODIC TABLE

#### S-Block Elements

- Electronic configuration:  $n^2$  (n=1 to 2)
- Consists of Group 1 to 2 (alkali metals and alkali earth metals)
- Also known as Representative or Main group elements.

#### P-Block Elements

- Electronic configuration:  $n^2(n-1)^2(n-2)^2$  (2 = 8-71)
- Consists of Lanthanoids and Actinoids
- Also known as Inner transition elements

#### D-Block Elements

- Electronic configuration:  $(n-1)^2(n-2)^2(n-3)^2$  (3 = 18-12)
- Consists of Group 3 to 12
- Also known as transition elements

#### F-Block Elements

- Electronic configuration:  $n^2(n-1)^2(n-2)^2(n-3)^2$  (2 = 90-1)
- Consists of Lanthanoids and Actinoids
- Also known as Inner transition elements

## NCERT LINE BY LINE QUESTIONS

**(1.) Assertion :** The elements beryllium, antimony, arsenic and tellurium have characteristics of both metals and non-metals.  
**Reason:** The metallic character increases as we go from left to right across the periodic table.

(a.) Both A and R are true and R is the correct explanation of A. (b.) Both A and R are true but R is not the correct explanation of A.

(c.) A is true but R is false. (d.) Both A and R are false.

**(2.)** Which of the following elements has highest first ionization enthalpy?  
(a.) P (b.) C  
(c.) O (d.) Ne

**(3.)** If atomic weights of lithium and potassium are 7 and 39 respectively, then what is the atomic weight of sodium according to Dobereiner's law of triads?  
(a.) 25 (b.) 23  
(c.) 14 (d.) 78

**(4.)** Select the correct order of size of the given species.  
(a.)  $I^- > I > I^+$  (b.)  $I > I^- > I^+$   
(c.)  $I > I^+ > I^-$  (d.)  $I^+ > I^- > I$

**(5.)** The sixth period contains 32 elements and successive electrons enter in the orbitals of  
(a.) 5s, 4f, 5d and 4p. (b.) 6s, 3f, 4d and 5p.  
(c.) 5s, 4f, 6d and 6p. (d.) 6s, 4f, 5d and 6p.

**(6.)** The size of an anion will be larger than that of the parent atom because  
(a.) The addition of one or more electrons would result in decreased repulsion among the electron and a increase in effective nuclear charge. (b.) The removal of one or more electrons results in increased attraction among the electrons.  
(c.) The addition of one or more electrons would result in increased repulsion among the electrons and a decrease in effective nuclear charge. (d.) The addition of one or more electrons results in decreased attraction among the electrons.

**(7.)** Identify the oxide which is amphoteric in nature.  
(a.)  $Al_2O_3$  (b.) NO  
(c.)  $Cl_2O_7$  (d.)  $Na_2O$

**(8.)** Some properties of inner-transition elements are given below. Choose the incorrect statements.  
(I) They are all non-metals.  
(II) Within each series, the properties of the elements are not similar.  
(III) The chemistry of the early actinoids is more simple than the corresponding lanthanoids.

(a.) I and II  
(c.) I and III

(b.) II and III  
(d.) I, II and III

**(9.)** Seaborg was awarded the Nobel Prize in Chemistry for his work. What name has been given to an element in his honour?

(a.) Tantalum  
(c.) Iridium

(b.) Molybdenum  
(d.) Seaborgium

**(10.)** Some order and their respective properties are given below. Choose the correct one.

(a.)  $\text{Na} < \text{Mg} < \text{Be}$ : Metallic character  
(c.)  $\text{Cl} < \text{S} < \text{P}$ : Non-metallic character

(b.)  $\text{K} < \text{Rb} < \text{Cs}$ : Reactivity  
(d.)  $\text{Br} < \text{Se} < \text{As}$ : Electron gain enthalpy

**(11.)** Some properties for the noble gases are given below. Choose the correct statements.

(I) All the orbitals in the valence shell are completely filled by electrons.  
(II) Very difficult to alter the electronic arrangement by the addition or removal of electron.  
(III) Exhibit very high chemical reactivity.

(a.) I and III  
(c.) I and II

(b.) II and III  
(d.) I, II and III

**(12.)** The period number in the long form of the periodic table is equal to

(a.) maximum principal quantum number of any element of the period.  
(c.) maximum Azimuthal quantum number of any element of the period.

(b.) magnetic quantum number of any element of the period.  
(d.) atomic number of any element of the period.

**(13.)** What are the oxidation state and covalency respectively of Al in  $[\text{AlCl}(\text{H}_2\text{O})_5]^{2+}$ ?

(a.) 3 and 6  
(c.) 2 and 6

(b.) 6 and 3  
(d.) 6 and 2

**(14.)** What is the symbol of the element Meitnerium.

(a.) Md  
(c.) Mo

(b.) Mt  
(d.) Mn

**(15.)** Match the oxide given in column I with its property given in column II.

	Column - I		Column - II
(P.)	$\text{Na}_2\text{O}$	(i.)	Neutral
(Q.)	$\text{Al}_2\text{O}_3$	(ii.)	Basic
(R.)	$\text{N}_2\text{O}$	(iii.)	Acidic
(S.)	$\text{Cl}_2\text{O}_7$	(iv.)	Amphoteric

Which of the following option has all correct pairs?

(a.) (i) - (B), (ii) - (D), (iii) - (A), (iv) - (C)  
(c.) (i) - (C), (ii) - (B), (iii) - (A), (iv) - (D)

(b.) (i) - (B), (ii) - (A), (iii) - (D), (iv) - (C)  
(d.) (i) - (A), (ii) - (D), (iii) - (B), (iv) - (C)

**(16.)** Which of the given periodic trends is correct?

(a.) Electronegativity increases down the group.  
(c.) Atomic radius increases down the group.

(b.) Ionization enthalpy increases down the group.  
(d.) Electron gain enthalpy increases down the group.

(17.) A quantitative measure of the tendency of an element to lose electron is given by its  
(a.) electronegativity.  
(c.) ionization enthalpy.

(b.) electron gain enthalpy.  
(d.) electronegativity and ionization enthalpy.

(18.) **Assertion:** Mendeleev periodic table had left the gap under aluminium and a gap under silicon, and called these elements Eka-Aluminium and EkaSilicon.

**Reason:** The elements gallium and germanium were known at that time Mendeleev published his periodic table.

(a.) Both A and R are true and R is the correct explanation of A.  
(c.) A is true but R is false.

(b.) Both A and R are true but R is not the correct explanation of A.  
(d.) Both A and R are false.

(19.) **Assertion:** The elements become more metallic as we go from left to right across the periodic table.

**Reason:** The elements become more non-metallic as we go down a group.

(a.) Both A and R are true and R is the correct explanation of A.  
(c.) A is true but R is false.

(b.) Both A and R are true but R is not the correct explanation of A.  
(d.) Both A and R are false.

(20.) The ionic radii can be estimated by measuring the distances between

(a.) anions and anions in ionic crystals.  
(c.) cations and anions in ionic crystals.

(b.) cations and cations in ionic crystals.  
(d.) None of these.

(21.) A qualitative measure of the ability of an atom in a chemical compound to attract shared electrons to itself is called

(a.) electron gain enthalpy.  
(c.) electronegativity.

(b.) ionization enthalpy.  
(d.) stability.

(22.) Which of the following oxides is most acidic in nature?

(a.) MgO  
(c.) BaO

(b.) BeO  
(d.) CaO

(23.) The first and the last of lanthanoids elements are

(a.) Th and Lr  
(c.) La and Lu

(b.) Ce and No  
(d.) Ce and Lu

(24.) What is the atomic number of the element which is considered as last element of the 3d series?

(a.) 30  
(c.) 20

(b.) 40  
(d.) 25

(25.) **Assertion:** A qualitative measure of the ability of an atom in a chemical compound to attract shared electrons to itself is called electronegativity.

**Reason:** The ionization enthalpy, electron gain enthalpy and electronegativity are measurable quantity.

(a.) Both A and R are true and R is the correct  
(b.) Both A and R are true but R is not the

explanation of A.

correct explanation of A.

(c.) A is true but R is false.

(d.) Both A and R are false.

(26.) According to Mendeleev's periodic table, which of the following elements has formula of oxide as  $R_2O_3$ ?

(a.) B

(b.) Be

(c.) Li

(d.) C

(27.) Which of the following is the correct order with respect to first ionization enthalpies?

(a.)  $Li < Na < K < Rb$

(b.)  $Rb > K > Na > Li$

(c.)  $Na < Li < K < Rb$

(d.)  $K > Rb > Na > Li$

(28.) Select the correct statement.

(a.) Reactivity of the alkali metals decreases down the group.

(b.) Reactivity of the halogens decreases down the group.

(c.) Reactivity of alkali metals and halogens decreases down the group.

(d.) Reactivity of alkali metals and halogens increases down the group.

(29.) Combination of which two blocks elements are also called representative elements.

(a.) s-block and d-block

(b.) s-block and d-block

(c.) s-block and p-block

(d.) d-block and f-block

(30.) **Assertion:** Energy is always required to remove electrons from an atom and hence ionization enthalpies are always negative.

**Reason:** The second ionization enthalpy will be lower than the first ionization enthalpy.

(a.) Both A and R are true and R is the correct explanation of A.

(b.) Both A and R are true but R is not the correct explanation of A.

(c.) A is true but R is false.

(d.) Both A and R are false.

(31.) The maximum number of elements that can be accommodated in fifth period is

(a.) 8

(b.) 18

(c.) 32

(d.) 20

(32.) Which among the following are the isoelectronic Species?

(a.)  $Mg^{2+}, Cl^-$  and  $Na^+$

(b.)  $O^{2+}, P^-$  and  $Mg^{2+}$

(c.)  $Na^+, O^{2-}$  and  $F^-$

(d.)  $Cl^-, F^-$  and  $O^{2+}$

(33.) The electronic configurations of Eu (Atomic No. 63), Gd (Atomic No. 64) and Tb (Atomic No. 65) are

(a.)  $[Xe]4f^76s^2, [Xe]4f^86s^2$  and  $[Xe]4f^85d^16s^2$

(b.)  $[Xe]4f^75d^16s^2, [Xe]4f^75d^16s^2$  and  $[Xe]4f^96s^2$

(c.)  $[Xe]4f^65d^16s^2, [Xe]4f^75d^16s^2$  and  $[Xe]4f^85d^16s^2$

(d.)  $[Xe]4f^76s^2, [Xe]4f^75d^16s^2$  and  $[Xe]4f^6s^2$

(34.) The physical and chemical properties of the elements are periodic functions of their

(a.) volume.

(b.) densities.

(c.) atomic masses.

(d.) atomic numbers.

(35.) The d-block elements in the periodic table lie in the group from

(a.) 4 to 11

(b.) 3 to 12

(c.) 3 to 13

(d.) 4 to 14

**(36.)** The distribution of electrons into orbitals of an atom is called its

- (a.) shell.
- (c.) series.

- (b.) electronic configuration.
- (d.) block.

**(37.)** Which of the following is correct with respect to electronegativity, metallic and non-metallic character of the elements?

- (a.) The increase in electronegativity across a period is accompanied by an increase in nonmetallic properties of elements.
- (c.) Electronegativity is inversely related to the non-metallic properties of elements.

- (b.) The increase in electronegativity down a group is accompanied by a decrease in nonmetallic properties of elements.
- (d.) Electronegativity is directly related to the metallic properties of elements.

**(38.)** A plot of  $\sqrt{v}$  against atomic number (Z) gave a straight line and not the plot of  $\sqrt{v}$  against atomic mass. Which of the following scientist observed such regularities in the characteristics X-ray spectra of the element?

- (a.) Dmitri Mendeleev
- (c.) A. H. B. de Chancourtois

- (b.) Henry Moseley
- (d.) Alexander Newlands

**(39.)** Which of the following statements regarding ionization enthalpy is correct?.

- (a.) The first ionization enthalpy will be higher than the second ionization enthalpy.
- (c.) The second ionization enthalpy will be higher than the third ionization enthalpy.

- (b.) The second ionization enthalpy will be higher than the first ionization enthalpy.
- (d.) The first ionization enthalpy will be higher than the third ionization enthalpy.

**(40.)** Fourth period ended with element of

- (a.) xenon.
- (c.) silver.

- (b.) krypton.
- (d.) copper.

**(41.)** Which of the following groups of elements has highly negative electron gain enthalpies

- (a.) Halogen group
- (c.) Alkaline earth metal group

- (b.) Chalcogens group
- (d.) Alkali metal group

**(42.)** Which of the following is the correct statement.

- (a.) The cation with the greater positive charge will have a smaller radius.
- (c.) The cation with the lower positive charge will have a smaller radius.

- (b.) The anion with the greater negative charge will have the smaller radius.
- (d.) The anion with the lower negative charge will have the larger radius.

**(43.)** Transition elements in the periodic table started from the atomic number

- (a.) 20
- (c.) 22

- (b.) 21
- (d.) 24

**(44.) Assertion:** The atomic size generally decreases across a period.

**Reason:** Effective nuclear charge increases as the atomic number increases across a period.

- (a.) Both A and R are true and R is the correct

- (b.) Both A and R are true but R is not the

explanation of A.

correct explanation of A.

(c.) A is true but R is false.

(d.) Both A and R are false.

**(45.) Assertion:** The two rows of elements at the bottom of the periodic table are called the lanthanoids and actinoids.

**Reason:** The elements after uranium are called trans-uranium elements.

(a.) Both A and R are true and R is the correct explanation of A.

(b.) Both A and R are true but R is not the correct explanation of A.

(c.) A is true but R is false.

(d.) Both A and R are false.

**(46.)** Which of the following properties does not belong to the *d*-block elements?

(a.) They exhibit specific oxidation states.

(b.) They are all metals.

(c.) They are mostly formed of coloured ions.

(d.) They are often used as catalyst.

**(47.)** Consider the two oxygen containing compounds  $OF_2$  and  $Na_2O$ . The order of electronegativity of the three elements involved in these compounds is

(a.)  $F > Na > O$

(b.)  $F > O > Na$

(c.)  $Na > F > O$

(d.)  $O > F > Na$

**(48.)** Which of the given element has highest electronegativity value as per Pauling scale?

(a.) Si

(b.) S

(c.) Be

(d.) Mg

**(49.)** Gadolinium belongs to 4f series. Its atomic number is 64. Which of the following is the correct electronic configuration of gadolinium

(a.)  $[Xe]4f^75d^16s^2$

(b.)  $[Xe]4f^65d^26s^2$

(c.)  $[Xe]4f^86d^2$

(d.)  $[Xe]4f^5d^1$

**(50.) Assertion:** Henry Moseley observed regularities in the characteristic X-ray spectra of element. A plot of  $\sqrt{v}$  (vis frequency.) against atomic number (Z) gave a straight line.

**Reason:** Henry Moseley showed that the atomic number is a more fundamental property of an element than its atomic mass.

(a.) Both A and R are true and R is the correct explanation of A.

(b.) Both A and R are true but R is not the correct explanation of A.

(c.) A is true but R is false.

(d.) Both A and R are false.

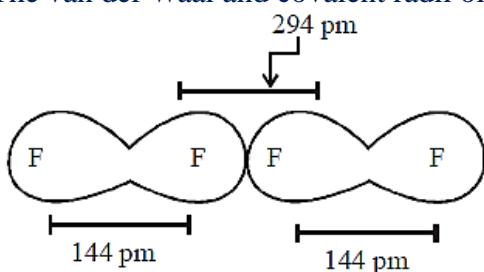
## TOPIC WISE NEET PRACTICE QUESTIONS

### TOPIC 1: Mendeleev and Modern Periodic Table

1. The molecular formula of chloride of Eka-Aluminium and Eka-Silicon respectively are  
 1)  $\text{GaCl}_3$  and  $\text{SiO}_4$       2)  $\text{GaCl}_3$  and  $\text{AlCl}_3$       3)  $\text{AlCl}_3$  and  $\text{SiCl}_4$       4)  $\text{GaCl}_3$  and  $\text{GeCl}_4$
2. Representative elements belong to  
 1) *s*- and *p*-blocks      2) *p*- and *d*-blocks      3) *f*-block only      4) *d*- and *f*-blocks
3. The tenth element in the periodic table resembles the element with atomic number  
 1) 2 and 30      2) 8 and 18      3) 2 and 54      4) 8 and 54
4. The elements with atomic numbers 9, 17, 35, 53 and 85 belong to  
 1) alkali metals      2) alkaline earth metals  
 3) halogens      4) noble gases
5. The element  $Z = 114$  has been discovered recently. It will belong to which of the following family group and electronic configuration?  
 1) Halogen family  $[\text{Rn}] 5f^{14} 6d^{10} 7s^2 7p^5$       2) Carbon family  $[\text{Rn}] 5f^{14} 6d^{10} 7s^2 7p^2$   
 3) Oxygen family  $[\text{Rn}] 5f^{14} 6d^{10} 7s^2 7p^4$       4) Nitrogen family  $[\text{Rn}] 5f^{14} 6d^{10} 7s^2 7p^3$
6. The most abundant element in the universe is thought to be  
 1) carbon      2) oxygen      3) hydrogen      4) nitrogen
7. Element with atomic number 47 belongs to the period .....and the group .....
8. Which of the following is the atomic number of a metal–  
 1) 32      2) 34      3) 36      4) 38
9. What is the IUPAC name of the element with atomic number 114 ?  
 1) Unununium      2) Unnilquadium      3) Ununquadium      4) Unnilennium.
10. The element with atomic number 118, will be  
 1) alkali      2) noble gas      3) lanthanide      4) transition element
11. If the atomic number of an element is 33, it will be placed in the periodic table in the  
 1) first group      2) third group      3) fifth group      4) seventh group.
12. The long form of periodic table consists of  
 1) Seven periods and eight groups      2) seven periods and eighteen groups  
 3) Eight periods and eighteen groups      4) eighteen periods and eight groups
13. Elements of which group form anions most readily?  
 1) Oxygen family      2) Nitrogen family      3) Halogens      4) Alkali metals
14. Element with electronic configuration  $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^6 4d^{10} 5s^2 5p^3$  belongs to the following group of the periodic table  
 1) 2nd      2) 5<sup>th</sup>      3) 3rd      4) 7th
15. Element having atomic no. of 56 belongs to which of the following block of periodic table?  
 1) *p*- block      2) *d*-block      3) *f*- block      4) *s*-block
16. Which of the following pairs has both members from the same period of the periodic table.  
 1) Na – Ca      2) Na – Cl      3) Ca – Cl      4) Cl – Br
17. Which group of the periodic table contains coinage metal ?  
 1) IIA      2) IB      3) IA      4) None of these
18. Which of the following period contain most of the manmade radioactive elements?  
 1) Seventh      2) Fifth      3) Sixth      4) Both 1) and 3)
19. Element X forms a chloride with the formula  $\text{XCl}_2$ , which is a solid with a high melting point. X would most likely be in the same group of the periodic table as –  
 1) Na      2) Mg      3) Al      4) Si
20. An element has electronic configuration  $1s^{22} 2s^{22} 2p^{63} 3s^{23} 3p^4$ .  
 1) Period = 3rd, block = *p*, group = 16      2) Period = 5th, block = *s*, group = 1  
 3) Period = 3rd, block = *p*, group = 10      4) Period = 4th, block = *d*, group = 12
21. Which of the following is the artificial element in the periodic table ?  
 1) Tc      2) Te      3) Ru      4) Os

## TOPIC 2: Atomic Radii, Ionic Radii and Ionization Energy

22. The correct order of radii is  
 1)  $\text{N} < \text{Be} < \text{B}$       2)  $\text{F}^- < \text{O}^{2-} < \text{N}^{3-}$       3)  $\text{N} < \text{Li} < \text{K}$       4)  $\text{Fe}^{3+} < \text{Fe}^{2+} < \text{Fe}^{4+}$



2) All isoelectronic ions belong to same period of the periodic table  
 3) I.E.1 of N is higher than that of O while I.E.2 of O is higher than that of N  
 4) The electron gain enthalpy of N is almost zero while that of P is  $74.3 \text{ kJ mol}^{-1}$

41. The atomic sizes are not significantly different for the series of elements  
 1) Bi, Na, K, Rb      2) Na, Mg, Al, Si      3) O, S, Sc, Te      4) Cr, Mn, Fe, Co

42. The correct sequence of the ionic radii of the following is  
 1)  $\text{Br}^- > \text{Cl}^- > \text{S}^{2-} > \text{O}^{2-} > \text{F}^-$       2)  $\text{Br}^- > \text{S}^{2-} > \text{Cl}^- > \text{O}^{2-} > \text{F}^-$   
 3)  $\text{Br}^- > \text{S}^{2-} > \text{Cl}^- > \text{F}^- > \text{O}^{2-}$       4) none of these

43. Ionization potentials of the following elements are in the order  
 1) Al > Ga > In > Tl      2) Al > Ga > Tl > In      3) Al > Ga > In > Tl      4) Al > Ga > Tl > In

44. Electron affinity is maximum for  
 1) Cl      2) F      3) Br      4) I

45. Consider the following four elements, which are represented according to long form of periodic table

	Y	
W	X	Z

Here W, Y and Z are left, up and right elements with respect to the element 'X' and 'X' belongs to 16th group and 3<sup>rd</sup> period. Then according to given information the incorrect statement regarding given elements is:

46. The electron affinity for the inert gases is  
 1) zero      2) high      3) negative      4) positive

47. An atom with high electronegativity has  
 1) large size      2) high ionisation potential  
 3) low electron affinity      4) low ionisation potential

48. The stability of + 1 oxidation state increases in the sequence:  
 1) Tl < In < Ga < Al      2) In < Tl < Ga < Al  
 3) Ga < In < Al < Tl      4) Al < Ga < In < Tl

49. Halogens and chalcogens family have highly ...P.. electron gain enthalpy. Here, P refers to  
 1) negative      2) positive      3) zero      4) infinity

50. Which one of these is basic ?  
 1) SiO<sub>2</sub>      2) SO<sub>2</sub>      3) CO<sub>2</sub>      4) Na<sub>2</sub>O

51. Which of the following sequence correctly represents the decreasing acidic nature of oxides?  
 1) Li<sub>2</sub>O > BeO > B<sub>2</sub>O<sub>3</sub> > CO<sub>2</sub> > N<sub>2</sub>O<sub>3</sub>      2) N<sub>2</sub>O<sub>3</sub> > CO<sub>2</sub> > B<sub>2</sub>O<sub>3</sub> > BeO > Li<sub>2</sub>O  
 3) CO<sub>2</sub> > N<sub>2</sub>O<sub>3</sub> > B<sub>2</sub>O<sub>3</sub> > BeO > Li<sub>2</sub>O      4) B<sub>2</sub>O<sub>3</sub> > CO<sub>2</sub> > N<sub>2</sub>O<sub>3</sub> > Li<sub>2</sub>O > BeO

52. Which one of the following is an amphoteric oxide ?  
 1) Na<sub>2</sub>O      2) SO<sub>2</sub>      3) B<sub>2</sub>O<sub>3</sub>      4) ZnO

53. An element X occurs in short period having configuration  $ns^2 np^1$ . The formula and nature of its oxide is  
 1) XO<sub>3</sub>, basic      2) XO<sub>3</sub> acidic  
 3) X<sub>2</sub>O<sub>3</sub>, amphoteric      4) X<sub>2</sub>O<sub>3</sub> basic

54. Which is chemically most active non-metal ?  
 1) S      2) O      3) F      4) N

55. Which is not the correct order for the stated property.  
 1) Ba > Sr > Mg ; atomic radius      2) F > O > N ; first ionization enthalpy  
 3) Cl > F > I ; electron affinity      4) O > Se > Te ; electronegativity

56. The correct order of acidic strength :  
 1) Cl<sub>2</sub>O<sub>7</sub> > SO<sub>2</sub> > P<sub>4</sub>O<sub>10</sub>      2) K<sub>2</sub>O > CaO > MgO  
 3) CO<sub>2</sub> > N<sub>2</sub>O<sub>5</sub> > SO<sub>3</sub>      4) Na<sub>2</sub>O > MgO > Al<sub>2</sub>O<sub>3</sub>

57. The elements with zero electron affinity are  
 1) Boron and Carbon      2) Beryllium and Helium  
 3) Lithium and Sodium      4) Fluorine and Chlorine

58. Which is true about the electronegativity order of the following elements?  
 1) P > Si      2) C > N      3) Br > Cl      4) Sr > Ca

59. The element having very high ionization energy but zero electron affinity is  
 1) H      2) F      3) He      4) B

60. In the process,  $\text{Cl(g)} + \text{e}^- \xrightarrow{\Delta H} \text{Cl}^{-1}(g)$ ;  $\Delta H$  is  
 1) positive      2) negative      3) zero      4) unpredictable

### NCERT LINE BY LINE QUESTIONS – ANSWERS

(1.)	d	(2.)	d	(3.)	b	(4.)	a	(5.)	d
(6.)	c	(7.)	a	(8.)	d	(9.)	d	(10.)	b
(11.)	c	(12.)	a	(13.)	a	(14.)	b	(15.)	a
(16.)	c	(17.)	c	(18.)	c	(19.)	d	(20.)	c
(21.)	c	(22.)	b	(23.)	d	(24.)	a	(25.)	c
(26.)	a	(27.)	b	(28.)	b	(29.)	c	(30.)	d
(31.)	b	(32.)	c	(33.)	d	(34.)	d	(35.)	b
(36.)	b	(37.)	a	(38.)	b	(39.)	b	(40.)	b
(41.)	a	(42.)	a	(43.)	b	(44.)	a	(45.)	b
(46.)	a	(47.)	b	(48.)	b	(49.)	a	(50.)	a

### TOPIC WISE PRACTICE QUESTIONS - ANSWERS

1) 4	2) 1	3) 3	4) 3	5) 2	6) 3	7) 4	8) 4	9) 3	10) 2
11) 3	12) 2	13) 3	14) 2	15) 4	16) 2	17) 2	18) 1	19) 2	20) 1
21) 1	22) 2	23) 1	24) 1	25) 2	26) 3	27) 2	28) 1	29) 1	30) 1
31) 1	32) 3	33) 1	34) 4	35) 4	36) 3	37) 3	38) 3	39) 2	40) 2
41) 4	42) 2	43) 4	44) 1	45) 4	46) 1	47) 2	48) 4	49) 1	50) 4
51) 2	52) 4	53) 3	54) 3	55) 2	56) 1	57) 2	58) 1	59) 3	60) 2

### NCERT LINE BY LINE QUESTIONS – SOLUTIONS

(1.) (d) Beryllium is a metal, while silicon, germanium, arsenic, antimony and Tellurium are considered metalloids and they have characteristics of both metals and non-metals. The elements become more metallic as we go down a group, the nonmetallic character increases as one goes from left to right across the periodic table.

(2.) (d) Among the given elements from period 2 of the periodic table, Ne has maximum first ionization enthalpy because of closed electron shells and very stable electron configurations.

(3.) (b) According to Dobereiner's law of triads, the atomic weight of sodium is 23.

**Assertion-Reason Type questions**

(4.) (a) The correct order of size of the given species is  $I^- > I > I^+$

(5.) (d) The sixth period ( $n = 6$ ) contains 32 elements and successive electrons enter  $6s, 4f, 5d$  and  $6p$  orbitals, in the order of filling up of the  $4f$  orbitals, it begins with cerium ( $z = 58$ ) and ends at lutetium ( $z = 71$ ) to give the  $4f$ - inner transition series which is called the lanthanoid series.

(6.) (c) The size of an anion will be larger than that of the parent atom because the addition of one or more electrons would result in increased repulsion among the electrons and a decrease in effective nuclear charge.

(7.) (a)  $Al_2O_3$  is amphoteric oxide. Amphoteric oxides behave as acidic with bases and as basic with acidic.

(8.) (d) The inner transition elements are all metals within each series, the properties of the elements are quite similar. The chemistry of the early actinoids is more complicated than the corresponding lanthanoids, due to the large number of oxidation states possible for these actinoid elements.

(9.) (d) Element 106 has been named seaborgium (Sg) in his honour.

(10.) (b) Reactivity of the group 1 elements increases down the group.

(11.) (c) All the orbitals in the valence shell of the noble gases are completely filled by electrons and it is very difficult to alter this stable arrangement by the addition or removal of electrons. The noble gases thus exhibit very low chemical reactivity.

(12.) (a) The period number in the long form of the periodic table is equal to maximum principal quantum number of any element of the period.

**Assertion-Reason Type Questions**

(13.) 43.(a) The oxidation state of Al is + 3 and the covalency is 6.

(14.) (b) IUPAC official name and symbol of the element atomic number 106 is Meitnerium (Mt).

(15.) (a)  $Na_2O$  – Basic  
 $Al_2O_3$  – Amphoteric  
 $N_2O$  – Neutral  
 $Cl_2O_7$  – Acidic

**Assertion-Reason Type questions**

(16.) (c) Among the given periodic trends, atomic radius increases down the group. Remaining other trends, electronegativity, ionization enthalpy, electron gain enthalpy, decrease down the group.

(17.) 20.(c) A quantitative measure of the tendency of an element to lose electron is given by its ionization enthalpy. It represents the energy required to remove an electron from an isolated gaseous atom in its ground state.

(18.) (c) The elements gallium and germanium were unknown at the time Mendeleev published his periodic table.

(19.) (d) The elements become more metallic as we go down a group, the non-metallic character increases as one goes from left to right across the periodic table.

(20.) (c) The radii can be estimated by measuring the distance between cations and anions in ionic crystals.

(21.) (c) A qualitative measure of the ability of an atom in a chemical compound to attract shared electrons to itself is called electronegativity.

(22.) (b) In metal moving down the group metallic character increases so basic nature increases, hence most acidic will be  $BeO$ .

(23.) (d) The order of filling up of the 4f orbitals begins with cerium ( $Ce$ ) ( $z=58$ ) and ends at lutetium ( $Lu$ ) ( $z=71$ ) to give the 4f - inner transition series which is called the lanthanoid series.

(24.) (a) 3d series elements started from scandium ( $z=21$ ) which has electronic configuration  $3d^1 2s^2$ . The 3d orbitals are filled at zinc ( $z=30$ ) with electronic configuration  $3d^{10} 2s^2$ .

(25.) (c) Electronegativity is not a measurable quantity, while ionization enthalpy and electron gain enthalpies are measurable quantity. However, a number of numerical scales of electronegativity of elements like Pauling scale, Mulliken-Jaffe scale, Allred-Rochow scale have been developed.

(26.) (a) According to Mendeleev's periodic table, boron has formula  $B_2O_3$  or  $R_2O_3$ .

(27.) (b) In general, ionization enthalpies decrease as we descend in a group.

(28.) (b) Within a group, the reactivity increases down the group, whereas within group of non-metals, halogens, reactivity decreases down the group.

(29.) (c) The p-block elements comprise with s-block elements are called the representative elements or main group elements.

(30.) (d) Energy is always required to remove electrons from an atom and hence ionization enthalpies are always positive. The second ionization enthalpy will be higher than the first ionization enthalpy because it is more difficult to remove an electron from a positively charged ion than from a neutral atom.

(31.) (b) Maximum 18 elements can be accommodated in the fifth period of the periodic table.

(32.) (c)  $Na^+$ ,  $F^-$  and  $O^{2-}$  are isoelectronic species because it consists of same number of electrons.

Eu :	$[Xe]4f^7 6s^2$
Gd :	$[Xe]4f^7 5d^1 6s^2$
Tb :	$[Xe]4f^9 6s^2$

(33.) (d) (d) The physical and chemical properties of the elements are periodic functions of their atomic numbers.

(34.) (d) The physical and chemical properties of the elements are periodic functions of their atomic numbers.

(35.) (b) The d-block elements in the periodic table lie in the group from 3 to 12.

(36.) (b) The distribution of electrons into orbitals of an atom is called its electronic configuration.

(37.) (a) Among the given statements option (a) is correct with respect to electronegativity, metallic and non-metallic character of the elements.

(38.) (b) In 1913 the English physicist Henry Moseley observed regularities in the characteristic X-ray spectra of the element. A plot of  $\sqrt{v}$  (where  $v$  is frequency of X-rays emitted) against atomic number ( $z$ ) gave a straight line and not the plot of  $\sqrt{v}$  vs atomic mass.

(39.) (b) The second ionization enthalpy will be higher than the first ionization enthalpy because it is more difficult to remove an electron from a positively charged ion than from a neutral atom.

(40.) (b) Fourth period ended with element of Krypton.

(41.) (a) Among the given groups, halogen group of elements has highly negative electron gain enthalpies and readily add one electron to attain the stable noble gas configuration.

(42.) (a) The cation with the greater positive charge will have a smaller radius because of the greater attraction of the electrons to the nucleus. Whereas the anion with the greater negative charge will have the larger radius.

(43.) (b) Transition elements in the periodic table started from the atomic number ( $z=21$ ), scandium.

(44.) (a) The atomic size generally decreases across a period. It is because within the period the outer electrons are in the same valence shell and the effective nuclear charge increases as the atomic number increases, resulting in the increased attraction of electrons to the nucleus.

(45.) (b) The two rows of elements at the bottom of the periodic table, called the lanthanoids Ce (Z = 58) - Lu (Z = 71) and actinoids, Th (Z=90)-Lr (Z = 103) are characterized by the outer electronic configuration  $(n-2)f^{1-14}(n-1)d^{0-1}ns^2$ . The elements after uranium are called trans-uranium elements.

(46.) (a) The d -block, transition, elements exhibit variable oxidation states.

(47.) (b) Correct order of electronegativity of the given elements is F > O > Na.

(48.) (b)

Element	Electronegativity value
Si	1.8
S	2.5
Be	1.5
Mg	1.2

(49.) (a) Electronic configuration of gadolinium (Gd) is [Xe]  $4f^75d^16s^2$ .

(50.) (a) Henry Moseley observed regularities in the characteristic x-ray spectra of the elements. A plot of  $\sqrt{v}$  (where  $v$  is frequency of x-rays emitted) against atomic number (Z) gave a straight line and not the plot of  $\sqrt{v}$  vs atomic mass. He thereby showed that the atomic number is a more fundamental property of an element than its atomic mass.

## TOPIC WISE PRACTICE QUESTIONS - SOLUTIONS

- (4) Chloride formulas
  - Eka-Aluminium =  $AlCl_3$  ( $ECl_3$ )
  - Eka-Silicon =  $GeCl_4$  ( $ECl_4$ )

Mendeleev arranged elements in horizontal rows and vertical columns of a table in order to their increasing atomic weights.
- (1) The s and p-block elements are collectively known as representative elements.
- (3) The magic number is 2, 8, 8, 18, 18, 32 according to which the elements are arranged in the periodic table. As the atomic number of the element is 10, so, it will resemble the elements with atomic number  $= 10 - 8 = 2$ ,  $10 + 8 = 18$ ,  $18 + 18 = 36$ ,  $36 + 18 = 54$ . This element resembles the element with atomic number 2, 54.
- (3) atomic number 9 is for F so its halogen series.
- (2) Z = 114 belong to group 14, carbon family electronic configuration  $[Rn]5f^{14}6d^{10}7s^27p^2$
- (3) Hydrogen is the most abundant element in the universe. The order of abundance of given elements in the universe is H > O > C > N
- (4) Electronic configuration :  $[Kr]4d^{10}5s^1$ ; period = 5<sup>th</sup>; group =  $10 + 1 = 11^{th}$
- (4) 38 is the atomic no. of strontium (Sr) which is s-block element and all the elements of s-block are metals.
- (3)      Digit                              Name  
 1    un  
 4    quad

Using above notation IUPAC name of element 114 is Ununquadium.

10. (2) Electronic configuration of element with atomic number 118 will be  $[\text{Rn}]5\text{f}^{14}6\text{d}^{10}7\text{s}^27\text{p}^6$ . Since its electronic configuration in the outer most orbit ( $\text{ns}^2\text{np}^6$ ) resemble with that of inert or noble gases, therefore it will be noble gas element.

11. (3) Element with  $Z = 33$   
 $(1\text{s}^22\text{s}^2\text{p}^63\text{s}^2\text{p}^6\text{d}^{10}4\text{s}^2\text{p}^3)$  lies in fifth (or 15<sup>th</sup>) group.

12. (2)

13. (3) Halogens are most electronegative elements i.e., they are likely to form anions most readily.

14. (2) Its valence shell has 5 electrons ( $\text{ns}^2, \text{np}^3$ ). It belongs to 5th group of the periodic table.

15. (4) Barium has atomic number 56. It is an alkaline earth metal i.e., found in *s*-block.

16. (2) Na and Cl both belongs to III period.

17. (2) Cu, Ag and Au are coinage metals. They belong to group IB (*d*-block) of periodic table

18. (1) Seventh period includes most of the man-made radioactive elements.

19. (2)

20. (1) By observing principal quantum number (n). Orbital (*s, p, d, f*) and equating no. of e<sup>-</sup>'s we are able to find the period, block and group of element in periodic table.

21. (1)  $\text{Tc}^{43}$  is the first artificial element.

22. (2)  $\text{F}^- < \text{O}^{2-} < \text{N}^{3-}$

23. (1) Energy is supplied in order to remove electron from atoms. So energy of atom increases when electron is removed from atom.

24. (1)

25. (2) When we move down the group, atomic size increases, distance between nucleus and valence shell electron increases and ionisation energy decreases.

26. (3) Ionisation potential increases while moving in a period.  
 Group V      VI      VII      VIII  
 Element N      O      F      Ne  
 Oxygen (group 6) has low ionisation potential than N (group 5) because of stable configuration of nitrogen (half-filled p-orbital)

27. (2) In case of halogens covalent radius is considered this bond is formed by overlapping of electron clouds; while noble gases remain monoatomic, in this case only way to obtain radius is through van der Waal radii.

28. (1) Ionic radii are inversely proportional to effective nuclear charge.  
 Ionic radii in the *n*th orbit is given as

$$r_n = \frac{n^2 a_0}{Z} \text{ or } r_n \propto \frac{1}{Z}$$

when *n* = principal quantum number  
*Z*-effective nuclear charge.

29. (1)  $\text{O}^{--}$  and  $\text{F}^-$  are isoelectronic. Hence have same number of shells, therefore greater the nuclear charge smaller will be the size i.e.,  $\text{O}^{--} > \text{F}^-$   
 further  $\text{Li}^+$  and  $\text{B}^{3+}$  are isoelectronic. therefore  
 $\text{Li}^+ > \text{B}^{3+}$   
 Hence the correct order of atomic size is.  
 $\text{O}^{--} > \text{F}^- > \text{Li}^+ > \text{B}^{3+}$

30. (1) (i) Noble gases do not have covalent radii. They have only van der Waal's radii.  
 (ii) Covalent radii is always smaller than corresponding van der Waal's radii  
 Atomic radius of neon being van der Waal's radius is larger than that of fluorine which is in fact is its covalent radius.

31. (1) Higher the screening effect, lower is the I.E.

32. (3) Greater than the first ionization energy because after removal of one  $e^-$ , effective nuclear charge increases.

33. (1) In case of Ga there are 10d-electrons in the penultimate energy shell which shield the nuclear charge less effectively, the outer electron is held firmly by nucleus. As a result, the ionisation energy remains nearly the same as that of aluminium inspite of the fact that atomic size increases.

34. (4)  $P^{5+}$  has more effective nuclear charge and smaller size than  $P^{3+}$ .

35. (4)  $[Ar]3d^54s^2$  due to half-filled configuration ( $d^5$ ), higher energy is required to removal of electron compared to other elements.

36. (3) Covalent radius is radius of an atom in its bound state i.e., in fluorine it is half of distance between two covalently bonded fluorine atoms; van der Waal radii is one-half of the distance between the nuclei of two identical non-bonded isolated atoms. These atoms are attracted toward each other through weak van der Waal's force hence van der Waal radii are very large.

37. (3) In general, the atomic and ionic radii increases on moving down in a group. But the element of second transition series (eg., Zr, Nb, Mo etc.,) have the almost same radii as the elements of third transition series (eg. Hf, Ta, W etc.). This is because of lanthanide contraction.

38. (3) As we move along the period, the atomic size decreases due to increase in nuclear charge. Therefore, it is more difficult to remove electron from an atom. Hence the sequence of first ionization enthalpy in decreasing order is  
 $F > N > C > B > Be$   
 But ionization enthalpy of boron is less as compared to beryllium because first electron in boron is to be removed from p-orbital while in beryllium, is to be removed from s-orbital. As s-orbital is closer to nucleus in comparison to p-orbital thus energy required to remove an electron from s-orbital is greater.

39. (2) The second ionization potential means removal of electron from cation  
 $C^+ = 1s^2 2s^2 2p^1, N^+ = 1s^2 2s^2 2p^2$   
 $O^+ = 1s^2 2s^2 2p^3, F^+ = 1s^2 2s^2 2p^4$   
 Therefore  $O > F > N > C$

40. (2) In the isoelectronic species, all isoelectronic anions belong to the same period and cations to the next period.

41. (4) The decrease in size of inner d-subshell due to added electrons and their shielding effect on the outer most electrons from the nuclear charge almost compensate for Cr, Mn, Fe and Co.

42. (2) Radii of anions carrying same charge decrease from left to right in a period and increase down the group.

43. (4) Barring few exceptions, ionization potential decreases down the group.

44. (1) Electron affinity is energy released when electron is added to isolated gaseous atom. Its value decreases down the group. So electron affinity of F should be highest among halogens but due to its smaller size electron affinity of Cl is more than F.  
 $\therefore Cl$  has highest electron affinity.

45. (4)
 

W : Phosphorus	Y : Oxygen	X : Sulphur	Z : Chlorine
Electronegativity	$O > Cl > S > P$	Catenation :	$S > P > O > Cl$
Electron Affinity :	$Cl > O > S > P$	Oxygen exhibits covalency of two only	

46. (1) Zero, because of the stable electronic configuration the noble gases do not show any force of attraction towards the incoming electron.

47. (2) An atom with high electronegativity has high IP.

48. (4) The stability of +1 oxidation state increases from aluminium to thallium i.e.  
 $Al < Ga < In < Tl$

49. (1) The halogen (group-17) and the chalcogens (group-16) are two groups of elements having highly negative electron gain enthalpies.

50. (4) Basicity of oxides decreases in a period from left to right.  $Na_2O$  is basic oxide,  $CO_2$ ,  $SiO_2$  and  $SO_2$  are acidic oxides. Alternatively, oxides of metals (e.g.,  $Na_2O$ ) are basic, while oxides of non-metals ( $SO_2$ ,  $SiO_2$  and  $CO_2$ ) are acidic.

51. (2) On passing from left to right in a period acidic character of the normal oxides of the elements increases with increase in electronegativity.

52. (4)  $\text{Na}_2\text{O}$  (basic),  $\text{SO}_2$  and  $\text{B}_2\text{O}_3$  (acidic) and  $\text{ZnO}$  is amphoteric.

53. (3)  $\text{ns}2\text{ p}1$  is the electronic configuration of III A period.  
 $\text{Al}_2\text{O}_3$  is amphoteric oxide.

54. (3)  $\text{F}_2$  has highest electronegativity, so it is chemically most active non metal.

55. (2) On moving along the period, ionization enthalpy increases. In second period, the order of ionization enthalpy should be as follows :  
 $\text{F} > \text{O} > \text{N}$ .  
But N has half-filled structure, therefore, it is more stable than O. That is why its ionization enthalpy is higher than O. Thus, the correct order of IE is  
 $\text{F} > \text{N} > \text{O}$ .

56. (1) Acidic character of oxide  $\mu$  Non-metallic nature of element. Non-metallic character increases along the period. Hence order of acidic character is  
 $\text{Cl}_2\text{O}_7 > \text{SO}_2 > \text{P}_4\text{O}_{10}$ .

57. (2) Fully filled electronic configuration

58. (1)  $\text{P} > \text{Si}$  electronegativity increases along the period.

59. (3) He has zero EA because of its completely filled subshells ( $1s^2$ ).

60. (2) The process represents the first electron affinity which is always exothermic. Hence  $\Delta H$  is negative.

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5. Encourage your colleagues to join these groups.

## **Additional notes:**

1. Avoid posting messages between 9 PM and 7 AM.
2. After sharing resources with students, consider deleting outdated data if necessary.
3. It's a NO Nuisance groups, single nuisance and you will be removed.
  - No introductions.
  - No greetings or wish messages.
  - No personal chats or messages.
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# SKILL MODULES BEING OFFERED IN MIDDLE SCHOOL



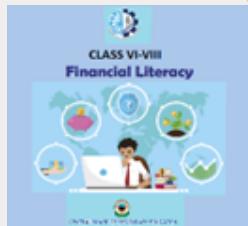
Artificial Intelligence



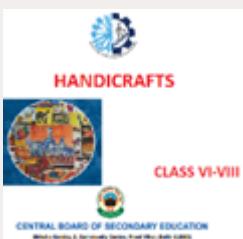
Beauty & Wellness



Design Thinking & Innovation



Financial Literacy



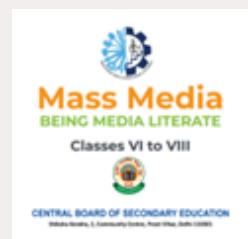
Handicrafts



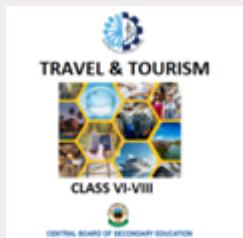
Information Technology



Marketing/Commercial Application



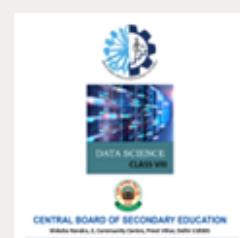
Mass Media - Being Media Literate



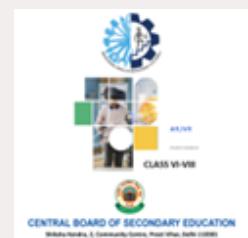
Travel & Tourism



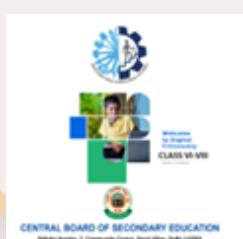
Coding



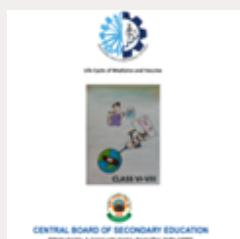
Data Science (Class VIII only)



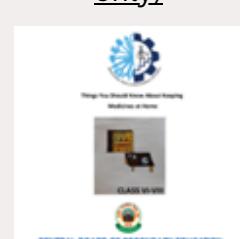
Augmented Reality/Virtual Reality



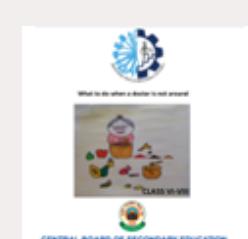
Digital Citizenship



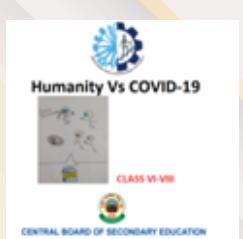
Life Cycle of Medicine & Vaccine



Things you should know about keeping Medicines at home



What to do when Doctor is not around



Humanity & Covid-19



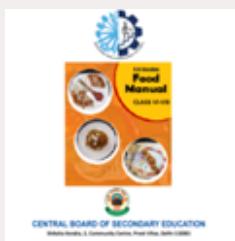
Blue Pottery



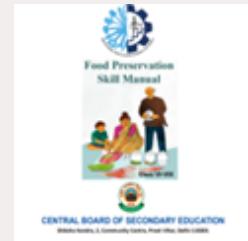
Pottery



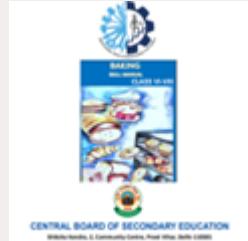
Block Printing



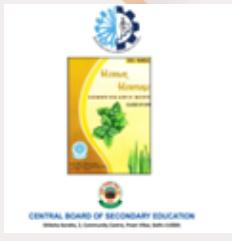
Food



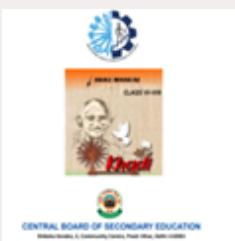
Food Preservation



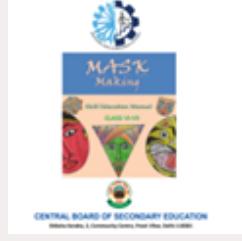
Baking



Herbal Heritage



Khadi



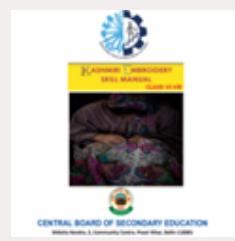
Mask Making



Mass Media



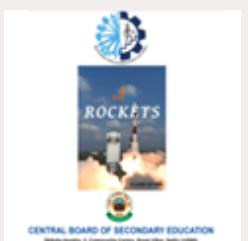
Making of a Graphic Novel



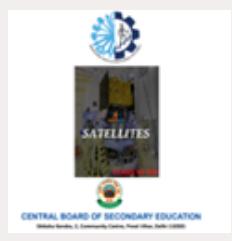
Kashmiri Embroidery



Embroidery



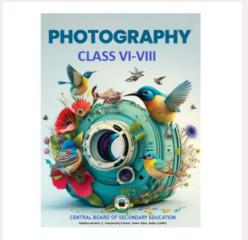
Rockets



Satellites



Application of Satellites



Photography

# SKILL SUBJECTS AT SECONDARY LEVEL (CLASSES IX – X)

## RETAIL

Subject Code: 401

TEXT BOOK FOR CLASS IX

## Employability Skills

Textbook for Class X

Skills, Abilities, Knowledge and Values, which are necessary for the successful completion of the course.

Retail

## Domestic Data Entry Operator

(Job Role)

Qualification: Pass in 10+2, 10+3, Diploma in Data Entry Operator, Basic Computer Knowledge, Technical Knowledge, Microsoft Office.

Information Technology

## Security

NSQF Level-1 & 2

CLASS IX-X

Student Handbook



Security

## AUTOMOTIVE LEVEL-1

Students Handbook

CLASS IX-X

CENTRAL BOARD OF SECONDARY EDUCATION

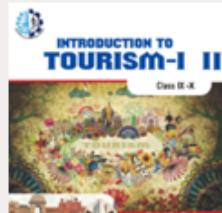
Address: 1, Laxmi Narayan Singh Marg, New Delhi-110001

Phone: 011-23332222, 011-23332223, 011-23332224

Automotive



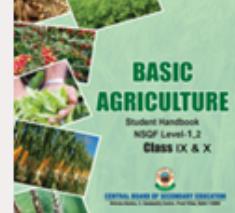
Introduction To Financial Markets



Introduction To Tourism



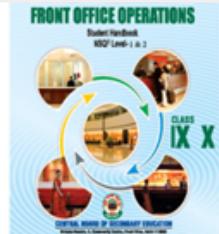
Beauty & Wellness



Agriculture



Food Production



Front Office Operations



Banking & Insurance



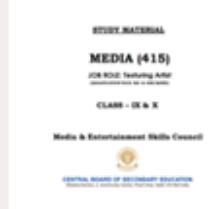
Marketing & Sales



Health Care



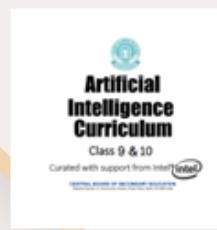
Apparel



Multi Media



Multi Skill Foundation Course



Artificial Intelligence



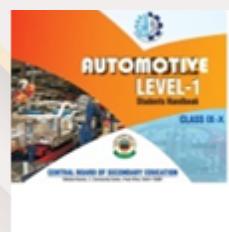
Physical Activity Trainer



Data Science



Electronics & Hardware (NEW)

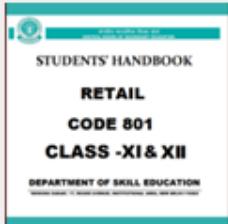


Foundation Skills For Sciences  
(Pharmaceutical & Biotechnology)(NEW)

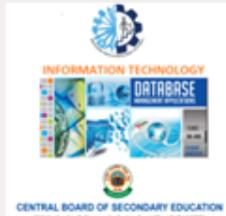


Design Thinking & Innovation (NEW)

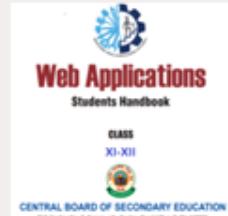
# SKILL SUBJECTS AT SR. SEC. LEVEL (CLASSES XI – XII)



Retail



Information Technology



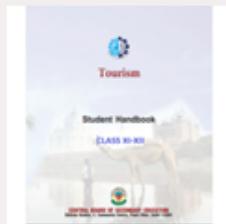
Web Application



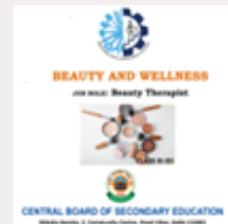
Automotive



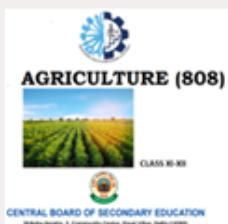
Financial Markets Management



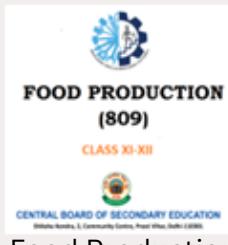
Tourism



Beauty & Wellness



Agriculture



Food Production



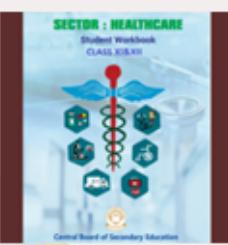
Front Office Operations



Banking



Marketing



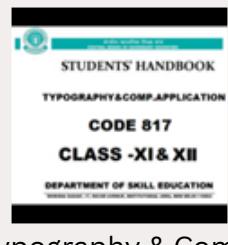
Health Care



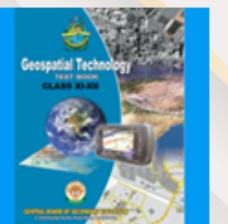
Insurance



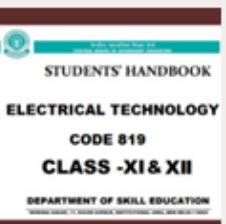
Horticulture



Typography & Comp.  
Application



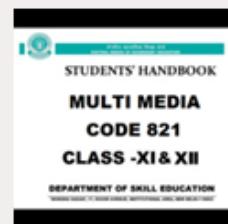
Geospatial Technology



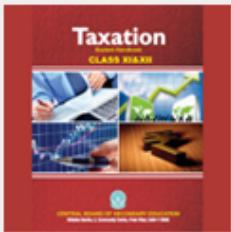
Electrical Technology



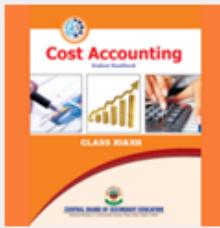
Electronic Technology



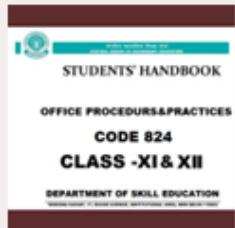
Multi-Media



Taxation



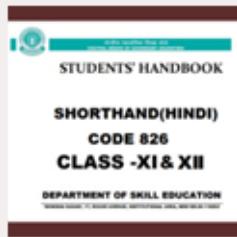
Cost Accounting



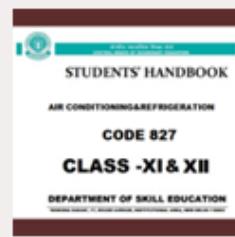
Office Procedures & Practices



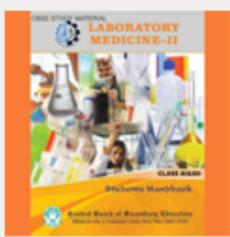
Shorthand (English)



Shorthand (Hindi)



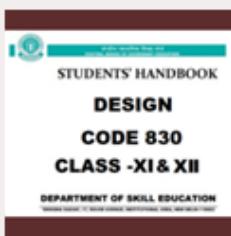
Air-Conditioning & Refrigeration



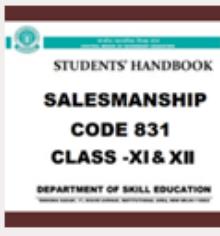
Medical Diagnostics



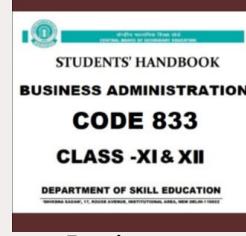
Textile Design



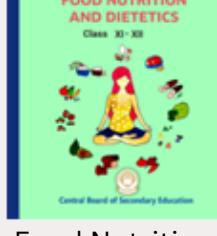
Design



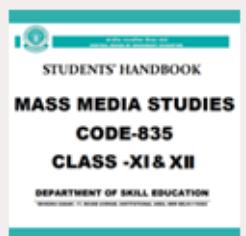
Salesmanship



Business Administration



Food Nutrition & Dietetics



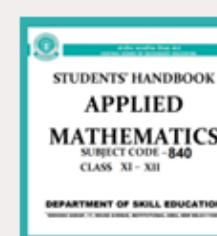
Mass Media Studies



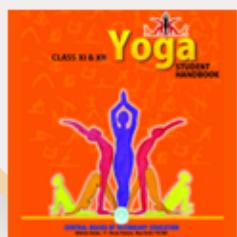
Library & Information Science



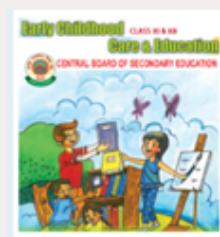
Fashion Studies



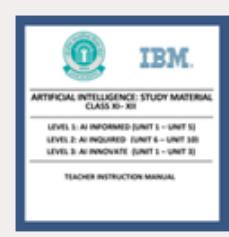
Applied Mathematics



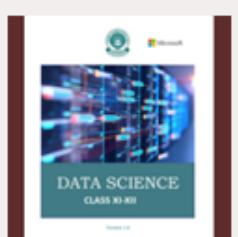
Yoga



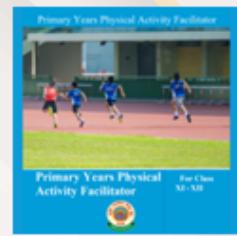
Early Childhood Care & Education



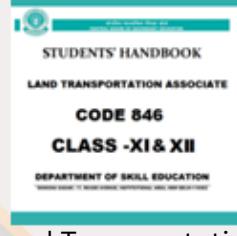
Artificial Intelligence



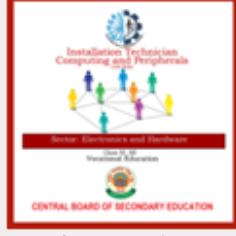
Data Science



Physical Activity Trainer (new)



Land Transportation Associate (NEW)



Electronics & Hardware (NEW)



Design Thinking & Innovation (NEW)

